RESULTS FROM 1999-2000 USDA IR-4 MBA FIELD TRIALS IN CA AND FL TOMATOES

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The field trials reported herein are part of a project of the USDA's IR-4 Program which began in 1998, to identify alternatives to methyl bromide for preplant soil fumigation in fresh market tomatoes. During the 2000 tomato growing season, four trials were conducted, two in California (Oceanside, San Diego Co., and Tustin, Orange Co.) and two in Florida (Lake Jem, Lake Co., and Live Oak, Suwannee Co.). This report summarizes the treatments and materials/methods used to evaluate the relative efficacy of the treatments tested.

A list of the treatments evaluated at each of the field trial sites is provided in Table 1 (CA) and Table 2 (FL). Product names, target rates and application methods are outlined for each material tested. Several of the treatments comprise two or more products, applied separately. These combination treatments were designed in an effort to control the broad spectrum of soilborne pests, pathogens and weed seeds that are currently controlled by the industry standard, methyl bromide/chloropicrin (mb/pic). Each treatment was replicated four times in a randomized complete block design. The replicate plot size in California was a single bed (64 inch centers), 75 ft. long at the Oceanside site and 150 ft. long at the Tustin site; in Florida, the replicate plot size was a single bed (60 inch centers), 75 ft long.

Over the course of each field trial, treatments were evaluated for their effects on the following variables: (1) control of soilborne phytopathogenic fungi (*R. Solani* and *V. dahliae* in CA, *P.ultimum* in FL), (2) control of plant parasitic nematodes (utilizing *T. semipenetrans*, citrus nematode, as an indicator species and indigenous *Meloidogyne* spp. in the CA tests, and indigenous *Meloidogyne* spp.in the FL tests), (3) control of weeds (utilizing both seeded and natural populations of various weed species), (4) tomato plant growth and vigor (using vigor ratings, leaf count and plant diameter measurements), and (5) tomato marketable and cull fruit yields.

The FL trials were established in March 2000 and have now been completed; efficacy data are being summarized and analyzed. Preplant applications at the CA trials were initiated in May 2000 and at the time of this writing (early September, 2000), fruit harvesting at both sites is just getting underway. Results from the marketable fruit yield evaluations at both the FL and CA trial sites will be highlighted in this presentation.

Table 1. Description of treatments (products, rates and application methods) tested in the 2000 IR-4 MBA California tomato field trials.

Trt. No.	Product(s)	Rate	Application Methodology
1	Iodomethane (1x) / Chloropicrin (67/33)	350 lbs	Bed/Shank injection [2]
2	Iodomethane (½x) / Chloropicrin (50/50)	235 lbs	Bed/Shank injection [2]
3	Iodomethane (½x)	116 lbs	Bed/Shank injection [2]
4	PlantPro-45 (1x)	142 gals (pre-plant)	Drip [3]
		63 gals (postplant x1)	Drip [3 4]
	+ Metam Sodium	37.5 gals	Broadcast spray over bed top [5]
5	PlantPro-45 (2x)	190 gals (pre-plant)	Drip [3]
		63 gals (postplant x2)	Drip [3 4]
	+ Metam Sodium	37.5 gals	Broadcast spray over bed top [5]
6	Metam Sodium	75.0 gals	Drip [3]
9	Metam Sodium	75.0 gals	Bed/Shank injection [6]
10	InLine (Telone C35 EC)	20.5 gals	Drip [3]
	+ Basamid	200 lbs	Broadcast over bed top, water-incorporated [7]
11	InLine (Telone C35 EC)	20.5 gals	Drip [3]
	+ Metam Sodium	37.5 gals	Broadcast spray over bed top [5]
12	InLine (Telone C35 EC)	20.5 gals	Drip [3]
13	Methyl bromide / Chloropicrin (67/33)	350 lbs	Bed/Shank injection [2]
14	Fosthiazate 500EC	4.5 lbs ai	Drip [3]
	+ Chloropicrin EC	200 lbs	Drip [3]
	+ Metam Sodium	37.5 gals	Broadcast spray over bed top [5]
15	Fosthiazate 900EC	4.5 lbs ai	Drip [3]
	+ Chloropicrin EC	200 lbs	Drip [3]
	+ Metam Sodium	37.5 gals	Broadcast spray over bed top [5]
16	Propargyl Bromide	150 lbs / 300 lbs [8]	Drip [3]
17	Chloropicrin EC	300 lbs	Drip [3]
	+ Metam Sodium	37.5 gals	Broadcast spray over bed top [5]
18	Metam Sodium (Check)	37.5 gals	Broadcast spray over bed top [5]
19	Untreated Control	---	----

[1] Rates are given in quantities of product per treated acre.
[2] Shank-applied using two shanks per bed, 10 inches apart and ~12 inches deep.
[3] All drip treatments were applied using 1.5 inches of water. All drip treatments were made using two lines per bed, located 5-6 inches to either side of the bed center.
[4] Postplant drip applications of PlantPro-45 were made at 35 days (Trt.#'s 4 and 5) and 70 days (Trt.#5 only) post-planting.
[5] Metam Sodium broadcast spray applications for bed-top weed control were applied using 1000 gallons of water per treated acre; beds were tarped immediately following application.
[6] Metam Sodium shank treatment applied using three shanks per bed, 7 inches apart and ~12 inches deep.
[7] Basamid granular formulation broadcast-applied to bed-top and incorporated using 3/4 inch of broadcast applied water.
[8] Propargyl bromide applied at a 1x rate of 150 lbs per treated acre at the Tustin site and at a 2x rate of 300 lbs per treated acre at the Oceanside site.

Table 2. Description of treatments (products, rates and application methods) tested in the

2000 IR-4 MBA Florida tomato field trials.

Trt. No.	Product(s)	Rate	Application Methodology
1	Iodomethane (1x) / Chloropicrin (67/33)	350 lbs	Bed/Shank injection [2]
2	Iodomethane (½x) / Chloropicrin (50/50)	235 lbs	Bed/Shank injection [2]
3	Iodomethane (½x)	116 lbs	Bed/Shank injection [2]
4	PlantPro-45 (1x) + Metam Sodium	95 gals (pre-plant) 63 gals (postplant x1) 37.5 gals	Drip [3] Drip [3 4] Broadcast spray over bed top [5]
5	PlantPro-45 (2x) + Metam Sodium	190 gals (pre-plant) 63 gals (postplant x2) 37.5 gals	Drip [3] Drip [3 4] Broadcast spray over bed top [5]
6	Metam Sodium	75.0 gals	Drip [3]
7	Metam Sodium	37.5 gals	Broadcast spray, rototill-incorporated [6]
8	Metam Sodium	75.0 gals	Broadcast spray, rototill-incorporated [7]
10	Telone C35 + Basamid	35 gals 300 lbs	Bed/Shank injection [2] First application broadcast over bed top at 175 lbs., rototill-incorporated. Second appl. at 175 lbs broadcast over bed top, water incorporated [8]
11	Telone C35 + Metam Sodium	35 gals 37.5 gals	Bed/Shank injection [2] Broadcast spray over bed top [5]
12	Telone C35	35 gals	Bed/Shank injection [2]
13	Methyl bromide / Chloropicrin (67/33)	350 lbs	Bed/Shank injection [2]
14[9]	Fosthiazate 500EC + Chloropicrin EC + Metam Sodium	4.5 lbs ai 200 lbs 37.5 gals	Broadcast spray over bed top, rototill-incorporated Drip [3] Broadcast spray over bed top [5]
15	Fosthiazate 900EC + Chloropicrin EC + Metam Sodium	4.5 lbs ai 200 lbs 37.5 gals	Broadcast spray over bed top, rototill-incorporated Drip [3] Broadcast spray over bed top [5]
16	Propargyl Bromide	150 lbs	Drip [3]
17	Chloropicrin EC + Metam Sodium	300 lbs 37.5 gals	Drip [3] Broadcast spray over bed top [5]
18	Metam Sodium (Check)	37.5 gals	Broadcast spray over bed top [5]
19	Untreated Control	---	----

[1] Rates are given in quantities of product per treated acre.

[2] Shank-applied using two shanks per bed spaced 10 inches from the bed center and 12-14 inches deep.

[3] All drip treatments other than PlantPro-45 were applied using 1.5 inches of water. Preplant applications of PlantPro-45 made with 1 and 2 inches water for Trt.#'s 4 and 5, respectively. Postplant PlantPro-45 applications made using 1 inch of water. All drip treatments were made using two lines per bed, located 5-6 inches to either side of the plant line, except Trt. # 6, which was applied using 3 lines per bed.

[4] Postplant drip applications of PlantPro-45 were made at 35 days (Trt.#'s 4 and 5) and 70 days (Trt.#5 only) post-planting.

[5] Metam Sodium broadcast spray applications for bed-top weed control (37.5 gals/treated acre) were applied using 500 gallons of water per acre; beds were tarped immediately following application. Pebulate was broadcast applied and rototill-incorporated for weed control across the entire plot area at the Live Oak test site. As a result, the metam bed-top spray for weed control was only done in Trt.#'s 11 and 18 at this site.

[6] Metam Sodium applied using 500 gallons of water per treated acre; beds were immediately rototilled to incorporate metam and then tarped.

[7] Metam Sodium applied using 1000 gallons of water per treated acre; beds were immediately rototilled to incorporate metam and then tarped.

[8] Basamid granular formulation applied twice, each time at 175 lbs/treated acre. First application was rototill incorporated; second application incorporated using ¾ inch of broadcast applied water.

[9] This treatment (Trt.# 14) not included at the Lake Jem test site.